北京景山学校 Name : Grade : Grade : Mathematics - Calculus ++. - Senior 2 - Assignment # 6 → → → → Nov.17

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Applications of the Derivatives to the variations of functions *[use one full page per function to answer. See model on next page].* 

For each of the following functions :

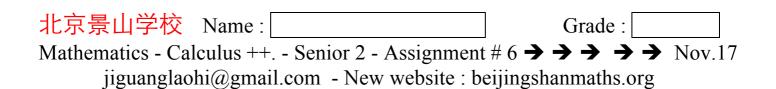
- 1. Give the set of definition,  $D_f$ , in the form of intervals (open or closed).
- 2. Calculate the Derivative by using the general formulas.
- 3. Solve the equation f'(x) = 0.
- 4. Study the sign of the derivative on the intervals of  $D_{f}$ .
- 5. Chart the sign of f'(x) on  $D_f$  and draw the variations of f accordingly.
- 6. Complete the chart with the limits of the function at every end of  $D_{f}$ .
- 7. Find the values of maximum and minimum if any (show value in chart).
- 8. Find the coordinates of the interception with the axes (Ox) and Oy)
- 9. Find the equation of each asymptote parallel to the axes or oblique.
- *10.* Sketch the curve (C<sub>f</sub>) of the function very carefully with its asymptotes. *You may check your answers on a computer or a graphic calculator, but you must draw the curve yourself.*

$$f_{13}(x) = \left| \frac{1+x}{1+|x|} \right|$$

$$f_{14}(x) = x + \sqrt{x^2 + 1}$$

$$f_{15}(x) = \frac{x^2 + 4x}{\sqrt{\left|x^2 + 4x + 1\right|}}$$

$$f_{16}(x) = x \sqrt{\left|\frac{1-x}{1+x}\right|}$$



f(x) =

- 1. Set of definition :  $D_f =$
- 2. Derivative f'(x) =
- 3. Zeroes and Sign of the derivative :
- 4. Asymptotes Equations (show calculations proofs on back) :

## 5. *Chart* :

